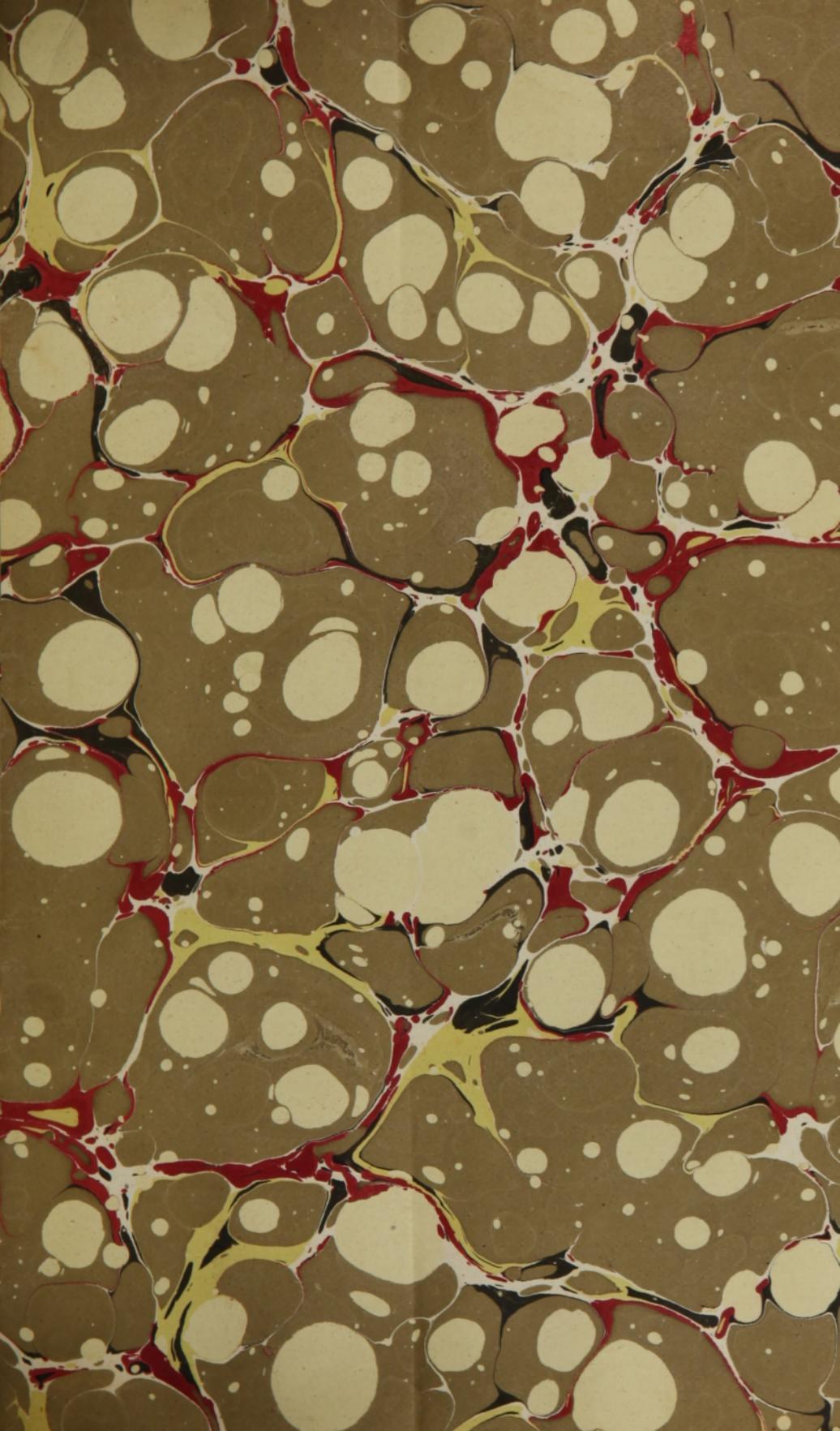


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AN
INAUGURAL DISSERTATION
ON THE
PRINCIPAL MINERAL WATERS

OF THE STATES OF
NEW-YORK AND NEW-JERSEY.

SUBMITTED TO THE REVEREND
JOHN H. LIVINGSTON, SS. T. P.

PRESIDENT, AND THE TRUSTEES OF
QUEEN'S COLLEGE, IN NEW-JERSEY ;

AND
TO THE PROFESSORS OF THE
MEDICAL INSTITUTION

OF THE
STATE OF NEW-YORK,
CONSTITUTING THE MEDICAL FACULTY OF THE SAME
FOR THE DEGREE OF
DOCTOR OF MEDICINE.

BY JOHN MEEKER,

LICENTIATE IN PHYSIC, AND VICE PRESIDENT OF THE HYGEAN SOCIETY OF NEW-YORK

ON THE 26th OF SEPTEMBER, 1815.

—
NEW-YORK :

1815.

81-15822

TO THE
 PROFESSORS OF THE
MEDICAL INSTITUTION
 OF THE
 STATE OF NEW-YORK, viz.

JOHN WATTS, M. D. Professor of the Institutes and Practice of Physic.

THOMAS COCK, M. D. Professor of Anatomy and Physiology.

ALEXANDER H. STEVENS, M. D. Professor of the Principles and Practice of Surgery.

VALENTINE SEAMAN, M. D. Lecturer on Clinical Surgery.

ARCHIBALD BRUCE, M. D. Professor of Materia Medica and Mineralogy.

ROBERT BAYARD, M. D. Professor of Midwifery and the diseases of Women and Children.

JOHN GRISCOM, A. M. Professor of Chemistry and Natural Philosophy.

This Dissertation is Respectfully Dedicated,
 With a high sense of their liberality and disinterestedness in the promotion of Medical Science; and of the Author's infinite obligations for their instruction and friendship.

JOHN MEEKER.

TO
DR. MATTHIAS FREEMAN,
AND
DR. NATHANIEL MANNING,

This Dissertation

Is inscribed, as a Testimony of

Gratitude and Respect, and

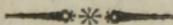
As an acknowledgment for

Their early instructions

In Medicine, by

THE AUTHOR.

DISSERTATION
ON THE
PRINCIPAL MINERAL WATERS
OF THE STATES OF
NEW-YORK AND NEW-JERSEY, &c.



WATER is never presented by nature in a state of complete purity. Even when collected as it descends in the form of rain, chemical tests detect in it a minute proportion of foreign ingredients. And when it has been absorbed by the earth, has traversed its different strata and is returned to us by springs, it is found to have acquired various impregnations, according to the different substances which it may have passed over. Thus it frequently contains either lime, iron, sulphur, or all of them as is the case with some of the waters now under consideration.

It is equally an object of interest to the investigating chemist, and the disciple of medical science, to ascertain the nature and properties of mineral and medicinal waters.

The object of the present essay, is to attempt to give a concise view of the chemical and medical properties of the most important mineral waters of the states of New-York, and New-Jersey; more particularly of those at Ballston and Saratoga.

At the present era, when new diseases are continually making their appearance, and bidding defiance to our art; that indolence in Physicians is criminal in the highest degree, which contracts their exertions to discover a remedy that will disrobe them of their fatality.

But a few years since, the dyspeptic and calculous patients were compelled to drag out an existence of pain and misery; the first, finding at best nothing but palliatives, the latter gaining no relief but in the dangerous operation of Lithotomy; Since a knowledge of the properties of the Saratoga water the torturing stone is melted down by its solvent properties, and the dyspeptic finds the proper tonic and stimulant for his stomach.

America has already had the honour of contributing some important articles to the materia medica; among them, the Ipecacuanha, Jalap, Polygala Sencka, and a Bark, which has removed the fatality of that disease which in less than half a century deprived Great Britain of two of her monarchs; and "who knows" says Dr. Rush "but that at the foot of the Allegany mountains, there blooms a flower that is an infallible cure for the Epilepsy? Perhaps on the Monongahela, or Potomac, there may grow a root, that shall supply, by its tonic power, the invigorating effects of the savage or military life, in the cure of consumptions."

And may there not in some neglected mineral water be found a property, that will share with mercury half the honours, and rival it of its proud pre-eminence in many diseases.

OF THE MINERAL WATERS

OF BALLSTON AND SARATOGA ;

Topographical description of the Country and Situation of the different Springs.

1st. *Ballston Springs* are situated in a valley which runs an easterly and westerly course ; through which passes a branch of the Kaydarosoras ; in the county of Saratoga in the state of New-York, and about one hundred and ninety miles north of that city, and about twelve miles west of the Hudson river. The principal springs are three in number ; that however which is principally used, is situated in the centre of the village ; the other two are about ten yards apart, and one hundred and thirty east of the first, they are neither of them so strongly impregnated as the first, and one emits the peculiar offensive smell of sulphuretted Hydrogen gas.

The country around is very broken, and chiefly covered with pines and hemlocks. The features of the country exhibit many appearances of iron. Bog ore has been found in considerable abundance about the springs and their vicinity. Upon digging into the earth near them,

I discovered ferruginous particles appearing like the rust of iron.

In fact iron is plentifully and universally diffused throughout nature. It may be detected in plants and in animal fluids. It is found in great masses, and in various states, in the bowels of the earth in most parts of the world.

The appearances of lime about the Ballston springs are very few, although lime is a principal article they hold in solution.

2d. The *Saratoga Springs* are situated about seven miles northeast of Ballston, in the County of Saratoga, and about twelve miles west of the confluence of Fish creek with the North river.

The springs are in a valley, which at the place where they rise, runs a northerly and southerly course, and appears to have been formed by a branch of the Kayadarosoras creek which passes through it, and empties into Owl pond, whence it effects a junction with the main stream at a small distance from where that terminates in the Saratoga Lake.

The soil is sandy about the springs; and lime-stone is found in great abundance. The high ground that forms the westerly bank of the valley whence the waters of these springs flow, a few inches below the surface, appear to be solid masses of calcareous rocks; which are blown up, and burnt for economic purposes; the product being quick lime.

The springs that are medicinally used are eight in number. But that one, to which I shall principally confine my remarks, is called the *Congress Spring*, from its having been discovered by a member of Congress, and since it is known by no other name.

The other springs, for instance, the *Columbian*, *Hamilton*, *Flat-rock*, *High-rock*, *President*, &c. are somewhat similar to the Ballston spring in their sensible qualities, and operations ; yet, not exactly so ; for there are no two precisely alike in all their properties.

About four miles west of these springs is a strong scented sulphureous spring.

Beside the springs already mentioned, there are others in the county of Saratoga. About ten miles east of the Congress spring, and two from the junction of Fish creek with the Hudson river, in a small valley, are several mineral springs which resemble those at Saratoga. At a short distance from these is another, entirely of a different nature, and from its smelling like the washings of a gun barrel, has obtained the name of *Gunpowder Spring*. The water is transparent ; its temperature 58° ; it smells and tastes like sulphur, or rather *hipar sulphuris*.

THE

PHYSICAL PROPERTIES

OF THESE

MINERAL WATERS.

The remarks that I shall now make will be confined to the Congress spring of Saratoga, and the principal one at

Ballston, which is in the centre of the village; each being the strongest spring of its respective place; they will, however, for the most part apply equally to the others.

1st. The water in general appears nearly transparent, yet not perfectly so, it is colourless and emits a great quantity of air by agitation; and by standing still in an open vessel it almost immediately forms bubbles around its inside, which soon rise up and are discharged. The vessel used to dip up the water, also the tube around the spring, soon gather an ochery crust upon their inner surface, which contains an earthy carbonate, and oxide of iron, which might be medicinally applied.

Wherever these waters stagnate around the spring, besides depositing the earthy matter before mentioned, their surface also soon becomes overspread with an iridescent pellicle of a metallic splendour, reflecting variegated colours.

2nd. They diffuse a subtle penetrating odour, which is most particularly experienced by breathing over the spring.

3d. The Hydrometer stands at the same height in them as in snow water.

4th. The discharge of air from these springs gives them the appearance of constant ebullition, yet they are cold. The temperature, however is not the same in all the springs. The medium temperature of the Congress and Ballston water in the summer is about 50° of Fahrenheit.

5th. By the application of a gentle heat, these waters discharge a great quantity of air in bubbles ; and it is upon this property that their use in raising bread depends, the air discharged being the same as that given off in the fermentation of yeast.

6th. A lighted candle let down near the surface of the water was immediately extinguished, both blaze and wick.

7th. A chicken was placed near the surface of the water, and expired in three minutes. Fish die almost instantly in this water. Several experiments convinced me that the air was as inimical to life as it was to combustion.

8th. The air being made to pass through lime-water immediately rendered it turbid.

From the above experiments we may safely conclude, that this air is the true *carbonic acid gas*, according to the new nomenclature, or the *fixed air* of Priestly and Black.

It is similar to the noxious gas which rises to the height of some inches in the famous *Grotto del Cani* in Italy.

It is this air which is so plentifully given out during the spirituous fermentation, and is what imparts briskness to champagne, porter, and other fermented liquors.

After ascertaining the Physical properties of these waters, to gain a knowledge of their constituent parts I had recourse to tests applied in the form of reagents.

THE EFFECTS

OF *REAGENTS* APPLIED

TO THE BALLSTON WATERS.

1st. A few drops of the Tincture of Galls in a tumbler of this water, immediately produced a dark purple cloud.

2nd. Lime-water added in equal quantities instantly imparted a milky turbidness, followed by a deposition of a white powder.

3rd. The carbonate of potash and ammonia rendered it turbid, and occasioned a white precipitate.

4th. Sulphuric Acid dropped into the water, caused a violent effervescence, occasioning a turbidness, and after several hours a precipitate of Gypsum.

5th. Nitrate of Silver dropped into the water, occasioned an immediate caseous precipitate; this, as also the water itself (not exposed to the sun's rays) soon assumed a dirty bluish colour.

6th. Acetite of Lead produced a copious white, but not granulated precipitate.

7th. Tincture of Turmeric was not changed.*

* Not being able to obtain any litmus or Violets, I could not try the water with those tests; but the existence of an uncombined

By boiling, it discharged a great quantity of air, formed a pellicle upon its surface, and deposited a yellow powder. Afterwards, it had not that brisk acidulous taste, but was extremely nauseous. It no longer became purple by the tincture of galls. It precipitated lime-water though sparingly, and also effervesced with Sulphuric acid, but was not made turbid thereby. It now changed the tincture of Turmeric to a red. Carbonate of potash now had no effect.

The foregoing experiments prove these waters to contain

1st. *Iron*. Hence the purple colour with tincture of galls, and the reason why brandy or rum is coloured black by mixing with this water; these liquors are kept in oaken casks, whereby they become true tinctures of vegetable astringents.

2d. An uncombined *Carbonic acid*, whereby lime-water became turbid; by immersing a burning taper in this air, it was extinguished; and after boiling, its acid properties were expelled, thereby proving it to be no other than the volatile carbonic acid, which is always expelled by boiling.

3d. A quantity of *Lime* held in solution by a supersaturation with carbonic acid; for although lime is rendered

carbonic acid was already proved; by adding lime-water in equal quantities, it produced a milkiness followed by a precipitate; this milkiness was produced by the lime of the water uniting with the uncombined carbonic acid, and forming an insoluble carbonate of lime which was precipitated.

insoluble by uniting with this acid, yet it is otherwise, when supersaturated with it; for then it is on the contrary much more soluble. Hence the cause of a precipitation by the potash and by the ammonia, from their affinity to the acid, they deprive the lime of its superabundance, and permit it to fall down in a white powder. The Sulphuric acid, on the contrary, from its superior attraction to the lime, unites with it and forms a Gypseous desposition, while the carbonic acid flies off with a great effervescence. These tests did not exhibit the same appearances with the water after ebullition. Hence the pellicle and deposition formed during that process, I take to be calcareous earth and iron.

4th. *A Muriatic Acid.* Whereby with nitrated silver it forms a copious white curdled precipitate. For the silver, quitting its solvent, for the more attracting muriatic acid, with it, forms a flaky precipitate in the form of muriate of silver.

5th. *A Muriatic Salt.* Since it is evident from the last mentioned experiment that these waters contain a marine acid, and by some of the previous ones that it does not exist in them in an uncombined state;* it must therefore be united either with an earth or an alkali; and as a carbonated alkali will be shown to be present in them, it is evident that it must be joined with the latter, as alkalies have a much stronger attraction for acids than earths have.

* The yellow tincture of Turmeric being changed to a red after the boiling of the water. proves the predominance of an alkali; therefore the muriatic acid could not have been present in an uncombined state at the same time; and it being a fixed acid, could not be dissipated by boiling.

6. A Carbonated alkali. Whereby, after the water had been boiled it rendered the tincture of turmeric red, and effervesced with sulphuric acid, and for the same reason lime water was still precipitated by it; the carbonic acid quit the alkali to unite with its more attracting lime, and formed therewith, as above mentioned, an insoluble compound. And that the phenomena was produced in part by a carbonate of an alkali, and not by the carbonate of magnesia alone, is evident from its changing the yellow colour of turmeric to that of a red, which could only have been effected by the presence of an alkali.

7. A slight impregnation of Sulphur, thereby darkening the nitrated silver. This experiment, it must be remembered, was made in the shade, for if it had not been, the sun's rays would have given it the dark colour, and thereby have rendered the experiment useless.

It is one of the known axioms in chemistry, that alkalies have a greater attraction for acids than either earths or metals; therefore since these waters are found to contain a carbonated alkali, it clearly proves that they cannot contain any earthy, or metallic salts other than carbonates, since the alkali, from its superior attraction to acids would necessarily prevent their formation.

From experiment No. 6, it appears that Sulphuric acid does not exist in the water, either in a separate or combined state.

From the foregoing experiments, it appears that this water contains

Carbonic acid.
Carbonate of Iron.

Lime held in solution by sursaturation with carbonic acid.

Muriatic salt.

Carbonated alkali, and probably a

Carbonated magnesia; and a

Sulphureous impregnation.

EFFECTS

OF REAGENTS ON THE

CONGRESS WATER.

1st. *Lime Water* added in equal quantities instantly occasioned a milky turbidness, and let fall a white precipitate.

2d. *Tincture of Galls* dropped into it, produced a dark purple cloud.

3d. *Nitrate of Silver* occasioned an immediate copious, white, curdled precipitate, which after standing sometime in the shade, became slightly dark, together with the water.

4. *Acetite of Lead* produced a copious white, but not granulated precipitate.

5. *Sulphuric acid* dropped into the water, occasioned a violent effervescence with a great discharge of air, after which it became turbid and let fall a white precipitate.

6. *Carbonate of Potash*, rendered it turbid, occasioning a white precipitate.

On boiling the water a great quantity of air was discharged, and a light yellow precipitate let fall: after which tincture of galls had no effect. The tincture of turmeric was changed to a bright orange red; lime-water was precipitated though sparingly; sulphuric acid produced effervescence; carbonate of potash had no effect.

By relating these experiments at full length, an opportunity is given for detecting their errors hereafter, and the erroneous inferences drawn from them.

It will be here seen that the reagents exhibit the same appearances on the Congress water, that they did on the Ballston; with a few exceptions only.

1st. The precipitate occasioned by the nitrate of silver dropped into the Congress water was more copious, and did not assume so dark a hue; which demonstrates that the muriatic salt is a greater constituent part of the water of the Congress spring than the other, and the precipitate not assuming so dark a colour, shows that the sulphureous impregnation is not so great.

2d. After boiling the water, and then adding the tincture of Turmeric, the change to a red was more brilliant; thereby evincing the presence of a greater proportion of alkali.

From the foregoing experiments, then, it will appear obvious to every one, that the ingredients are the same in both the springs in point of quality, but not in quantity. Now to ascertain the proportion of each of the ingredients in the water, and the different proportions in the two springs, I had recourse to the more tedious processes of evaporation and crystallization.

I evaporated two pounds of the water from each spring, in glass vessels, by the aid of a water bath of 110° , and obtained from the water of the Ballston spring a yellow residuum, which when dried weighed 60 grs. After a great part of the water had been evaporated, I observed the well known cubic crystals of muriate of soda beginning to form upon its surface, they were however soon disturbed by irregular saline concretions. This discovery at once informed me that the muriatic salt, before discovered to exist in the water, was the muriate of soda, (common salt,) and that the carbonated alkali, was the carbonate of soda.

The evaporated Congress water gave a light yellow residuum, which, when dried weighed 148 grains. Cubic crystals likewise were observed to form on this mass during evaporation.

It is well known to many persons that a salt is extracted from the Congress water, which acts on the bowels similar to sulphate of soda, (Glauber's salt,) and from this circumstance it is supposed to contain a large proportion of that substance but which, from the foregoing experiments is shown not to exist in the water at all, for the precipitate with acetite of lead not appearing granulated, is a definitive proof that the sulphuric acid is not present in the water, either in a separate or combined state. The salt is also destitute of the bitter taste, that characterizes sulphates with an alkali. But it is not necessary that sulphate of soda should be present in the salt to make it purgative: muriate of soda, or any of the neutral salts taken in large quantities will stimulate the bowels, and increase their peristaltic motion.

Even pure elementary water, taken in the quantity that the Congress water often is, would both operate as a cathartic and diuretic.

Unfortunately when I evaporated the water at the springs, I was unable to procure the proper articles for analyzing the residuum ; whereby each proportion of the different ingredients might have been ascertained.

A SUMMARY

OF THE ARTICLES FOUND

IN THE

CONGRESS WATER.

Carbonic acid.

Carbonate of iron.

A large proportion of the muriate and carbonate of soda.

Carbonate of magnesia.

Lime held in solution by sursaturation with carbonic acid, and a

Slight impregnation of sulphur.

All that remained now, was to ascertain the proportion of its aerial impregnation, which could only be done accurately by the aid of a mercurial trough. I accordingly procured a few bottles of the fresh water well corked and sealed, to prevent the discharge of any of its gaseous particles, and brought them with me to New-York : but by

a series of unfortunate and perplexing circumstances, I was compelled to relinquish the attempt.

From the experiments of Henry and others, it appears that water is capable of absorbing about equal its bulk of carbonic acid gas at the temperature of 55° , and proportionably less as its temperature is increased. Now, as the air in this water is continually raising up in bubbles and passing off, it is evident it must be fully saturated with it; and as it is of the temperature at which water will retain about equal its bulk, we of course conclude that it contains that proportion.

Doctors Seaman and Vandervoort instituted experiments which proved this water to contain about its equal in volume of this air.

But might we not expect to find in this water more than its equal in bulk of this air, from the quantity of lime which is held in solution by sursaturation with carbonic acid gas, and which is given out with the air of the water on the application of heat?



In the city of New-York are two mineral waters. One has been known for several years as such, and the presence of iron in it is made obvious by the ochery substance collected on the pavement, and its giving a black colour to brandy or rum when mixed with it; yet it is so weak a mineral water that it is not made unfit for culinary purposes; This is found at the corner of Varick and North Moore street, near St. John's chapel.

The other is a water of more importance, and has but recently been discovered; it is situated at the corner of Oak and James streets. It is a well of twenty feet or more in depth, and the water when pumped up exhibits some appearance of briskness, air is seen to collect around the sides of the vessel in bubbles which soon rise up and are discharged; its sensible qualities betray a strong saline impregnation, not unlike the Congress water, but considerably weaker. It evidently has an impregnation of sulphur; the presence of iron is made manifest by its giving the dark colour to brandy, and I conclude, from its effect on lime water that part of the air at least, contained in this water is the carbonic acid gas.

This water operates on the bowels and kidneys: I was told by a person, that he had been very much relieved of a calculus in the bladder by drinking this water.

The waters of New Lebanon which are about 50 miles south of Saratoga are pure and limpid, being of the proper temperature for bathing; they are 72° of Fahrenheit. On the first immersion a shock is received nearly equal to what is felt upon going into river water on a hot summer's day; in a few minutes the sensation of coldness goes off, a most agreeable warmth succeeds, and if the person remain in the bath, ten or fifteen minutes a relaxation of the vessels and muscular parts will ensue; this may justly be esteemed one of the chief properties of the waters of New Lebanon.

The water has a constant ebullition of air bubbles passing through it, which from the experiments of Dr. Seaman proved to be azotic gas, It contains no iron or lime, nor

any other metallic or earthy matter. It neither curdles milk nor soap.

MINERAL WATERS

OF NEW-JERSEY.

In Jersey are some mineral waters of considerable efficacy,

1st. The water of Schooley's Mountain in the town of Washington, in the county of Morris, ranks as the first. For a considerable number of years it has claimed the attention of suffering invalids, particularly those belonging to the class of debility.

Dr. M'Nevin of New-York has lately made a complete analysis of this water; he says the "spring is situated in a deep defile, between two beautifully wooded mountains, and issues from the perpendicular side of a steep rock, about forty or fifty feet above the level of a brook that gurgles and foams over a rocky bottom within a few paces of it. The extremity of a wooden leader is adapted to the cleft in the rock to receive the water, and convey it to the platform where the drinkers assemble; and to recesses, whither the bathers retire. The spring discharges a gallon in about two minutes and an half, and the quantity is not observed to vary under any changes of season or weather. Its temperature, at its issue from the rock, was found to be fifty-two degrees of Farenheit."

Seventy-four ounces of this water, slowly evaporated, left a brownish residuum of 4.10 grains. The Doctor

submitted 16.50 grains, the residuum of this water to analysis, and the following was the result.

Extractive	-	-	-	0.92
Muriate of soda	-	-	-	0.43
Muriate of lime	-	-	-	2.40
Muriate of magnesia	-	-	-	0.50
Carbonate of lime	-	-	-	7.99
Sulphate of lime	-	-	-	0.65
Carbonate of magnesia	-	-	-	0.40
Silex	-	-	-	0.80
Carbonated oxide of iron	-	-	-	2.00
Loss	-	-	-	0.41
				<hr/>
				16.50

This water was found to contain one third its bulk of Carbonic acid gas; which was proved not to be in an uncombined state, by the infusion of litmus not being changed by the water.

This water has gained much just celebrity, in cases of calculous concretions.

2d. Near Perth Amboy in the county of Middlesex is a Spa-water somewhat similar to the water of Schooley's Mountain. It is a strong chalybeate; the tests of iron manifest a stronger impregnation of that metal in this water, than in the water of Ballston: an oxide of iron is deposited all round the spring, and wherever the water stagnates.

There is an impregnation of sulphur, evinced by the dark colour given to the water by adding the nitrate of silver : lime-water caused a slight turbidness, followed by a precipitate ; this shows the presence of carbonic acid, but which is not uncombined.

The water from the spring is clear and transparent, but after standing several days an oxide of iron is precipitated, and the water is changed to an olive colour. Sulphuric acid produced no effervescence. After boiling the tests discovered no iron.

This water has cured several of dyspeptic, and other chronic complaints.

3d. In the town of Aquackanock in the county of Essex, is a mineral spring, whose properties principally depend upon the iron held in solution which is its chief impregnation.

Note. Near the village of Greenbush, in Rensselaer county New-York; on land belonging to Gen. Van Rensselaer is a Harrow-gate water highly deserving of notice. It strongly emits the odour of Sulphuretted Hydrogen gas, and it no doubt contains some of the Hydro-Sulphurets. Its similarity to the Harrow-gate water of England is striking, and remarked by every one who has drank of both. It is highly beneficial in cutaneous diseases, worms, chronic rheumatism, and many other chronic diseases.

THE OPERATION

OF THE

CONGRESS AND BALLSTON WATER ;

AND THE DISEASES WHEREIN

THEY MAY BE JUDICIOUSLY EMPLOYED.

“ If but one leper cur'd made Jordan's stream
 In sacred writ a venerable theme ;
 What honours to thy sovereign waters due,
 Where sick by thousands do their health renew !”

By knowing the composition of these waters we are enabled to apply them medicinally to diseases. Inattention to this consideration, still tends to support what former ignorance as to their contents, originally established in respect to the use of them. They had proved efficacious in the cure of some diseases, but upon what principle was unknown. Hence, like most other remedies which gain a degree of reputation, before their qualities are known ; they were looked upon as a kind of *Panacea*, a cure for all diseases : So that to be unwell was a sufficient reason for applying to them for relief ; they were indiscriminately taken in diseases of directly opposite natures ; hence the *Sthenic* and *Asthenic* patients were both seen hovering around the springs for relief ; but it is an universal law in medicine, that, that remedy which possesses active curative powers in one set of diseases, is equally injurious in another.

These waters may generally be taken in very large quantities, without producing any uneasiness or sense of weight in the stomach; but in some instances, when drank in large quantities, they cause a sense of coldness, and sometimes though very rarely, prove emetic. Some persons will drink several quarts within an hour, without any inconvenience otherwise than affecting the bowels two or three times, and operating very copiously as a diuretic. They at the same time produce a gentle diaphoresis. When taken in small doses, for instance, a half a pint, or a pint, every two or three hours, they act more particularly on the two last excretions. Their operation upon the bowels may pretty certainly be calculated upon, if taken before breakfast; if not taken till afterwards, they more generally affect the other excretions. Therefore by a little attention to the time and to the quantity taken, we are enabled to determine their action to such parts, as the nature of the case for which they are directed may require.

These waters generally exhilarate the spirits, and sometimes produce an unpleasant vertigo. In some persons they induce a degree of inebriety, similar to wine. They not unfrequently cause drowsiness if drank immoderately: they increase the appetite, and prove a pleasant stimulus to the stomach.

Dyspepsia (or Indigestion), of all the diseases for which these waters are prescribed, claims the precedence. There is probably none which will more certainly support their reputation, and keep up a concourse of valetudinarians.

As long as the pamperings of luxury and the love of ease, shall prevail over simplicity in diet, and an active life ; so long will the springs be resorted to by a train of such invalids. The carbonic acid furnishes the cordial exhilarating stimulus, the salt promotes digestion, while the iron restores the lost tone of the enervated stomach ; at the same time the soda corrects the acidity so often predominating ; and the whole composition, when judiciously managed, obviates the costiveness, so frequently an aggravating attendant upon them. The change of air, and exercise necessarily imposed upon such patients as reside in large cities ; (the foster mother of this disease,) together with the qualities of the water, seem almost peculiarly applicable to this disease.

In general relaxations of the system, whether from intemperance, or from a long residence in a hot climate ; from the effects of Syphilis, or from long and repeated courses of mercury, here equally find an antidote, and stand as rivals in perpetuating the fame of these saline and chalybeate waters.

The waters are almost universally applicable in asthenia, or cases of debility, there are however exceptions, as consumptions &c. In chronic and protracted billious cases, jaundice, &c. they are used with a happy effect ; their gentle tonic and stimulating properties brace up the relaxed biliary vessels, correct the morbid secretion, and excite the torpid absorbent system to take up the superfluent bile. To facilitate the cure they must be used externally as well as internally. The time for bathing is always in the morning, except in some particular cases ; but never immediately after eating.

In Chlorosis, and the other affections arising from debility in the uterine system, these mineral waters have been successfully employed: nor need we doubt of their usefulness, particularly if their operation is supported by due attention to exercise and diet. Even if it were from their cathartic effect alone, we might expect relief from their use. Dr. Hamilton in treating of this disease says "Costiveness always preceeds and accompanies the other symptoms." This induces the feculent odour of the breath, disordered stomach, depraved appetite, and impaired digestion. But it is not from the cathartic effect alone that we look for relief; we find in these waters, one of the best of emmenagogues: while the saline ingredient removes that troublesome costiveness, the chalybeate increases the tone and energy of the system, and determines the blood more to the uterus; the alkali removes the tendency to acid upon the stomach. The instances are numerous in which these waters have effected a cure, even when the disease was far advanced, when the face has become pale, or assumes a yellowish hue; the whole body emaciated, flaccid, and likewise pale; the feet affected with œdematous swellings; the breathing much hurried by any vigorous exertion of the body; the pulse quick, but small; and the person affected by many of the symptoms of hysteria. The water should be drank according to the symptoms, assisted by the cold and warm bath.

Calculus complaints are among those which apply there in the greatest proportion for relief; nor do they apply without reason; the composition of the waters being such as would lead us, a priori to look to them as a remedy. Lime water, soda, and all preparations which

contain an alkaline property for their base have been celebrated as lithontriptics from the earliest records of medicine. The experiments of Saunders, Percival and others prove that urinary calculi immersed in water impregnated with carbonic acid were diminished. Priestly and Percival have proved that fixed air, as well as alkalis, would, when taken into the stomach, pass through the circulation and appear undecomposed in the urine. Springfield observed that human calculi were diminished by being immersed in the urine of a person who drank of the acidulous waters, while that of a healthy person not drinking of them, added to their bulk. There are many persons in New-York, who daily apply to the soda water for calculous complaints, and find relief.

Here then we find in these waters all the remedies that have proved the most efficacious in such affections. And experience fully realizes the most sanguine expectations. I have collected numerous and well authenticated instances of their utility : the waters should be drank freely, the diet nutritive, and free from any thing that would generate acid.

Dr. Seaman says, " A number of cases have come within my own particular knowledge, and Dr. Powel whose long residence at the springs, has given him a full opportunity of ascertaining the fact, assures me that they are a valuable remedy in gravel, and that he has rarely seen a case of it, where relief was not obtained."

Phagedenic, ill conditioned and gangrenous ulcers : The wards of the New-York Hospital have long borne ample testimony to the powerfully antiseptic quality of the carbonic acid, as applied by means of the yeast poul-

tice to such ulcers ; by correcting the foetid sanious unhealthy discharge, by improving their disposition, and increasing the growth of healthy granulations. Now from the established salutary operation, of this predominating principle in these waters, we can have no doubt but that they may be a useful remedy in such complaints. And as the constitution is generally more or less impaired, taking the waters internally as well as using them externally, will expedite the cure.

In Chronic Rheumatism ; the gentle tonic, and aperient qualities of these waters, have a good effect. As the chronic rheumatism is diametrically opposite to the inflammatory, and as the inflammatory is aggravated by these waters ; patients ought to be extremely careful in using them. As all remedies that have been celebrated for rheumatism operate by the skin, they should be drank so as to determine to the surface ; by drinking freely of the water, and immediately going into the warm bath the intention is admirably answered.

I cannot find that many cases of the Gout have applied for relief, but from its similarity to the rheumatism, and from the nature of the waters, I presume beneficial effects may be expected from their use, particularly in the atonic, the retrocident or misplaced. From the youth of our country, and the activity of its inhabitants ; that associate of indolence and luxury is not so familiar as in England ; if that should ever be the case, I presume these mineral waters will be as celebrated in this disease as the Bath waters of England are.

Dropsy has been cured by these waters ; and from their possessing the stimulating and evacuating qualities as already mentioned, it appears no way improbable ; in the

early stages of the disorder, they may promote the absorption of the fluid in the cavities of the human body, and carry it entirely out of the system. I learnt the case of a lady who was cured of an obstinate ascites, she had been labouring under for a long time, by the conjoined operation of drinking and bathing. In many cases of dropsy the Congress water is preferable.

There are likewise very satisfactory accounts of paralytic affections being cured, or at least considerably relieved, by the internal and external use of these waters.

Scrofula has long been considered, though reluctantly by Physicians, as one of the incurable diseases. It is truly one of the opprobria medicorum. A remedy that would cure this disease, has been as much desired and sought after by Physicians, as the Philosopher's stone by the ancients and credulous Alchymists. It is due to the virtues of these waters, to say, that their resolving qualities have dissolved the indolent tumours, and their invigorating power, has given tone and energy to the relaxed fibres of the scrofulous patient; aided by the necessary exercise consequent upon a visit to the springs, and enjoyment of the salubrious air of the country, have enabled many to return relieved, to the astonishment of their friends. Dr. Powell in a communication to Dr. Seaman on these waters, says, "In scrofula their usefulness is perhaps more uniform and extensive than in any other disease whatever; and so numerous are the instances I have witnessed of their happy effect therein, that I am inclined to believe a well directed course of drinking and bathing, in those who are young, will totally eradicate its taint from the system."—It is remarkable of this dis-

ease, that most of the remedies which have gained any celebrity in its cure, have been composed in part of the muriatic acid. Salt water and sea bathing have been recommended from the earliest period of medicine and still support a deserved reputation; of late, the muriate of barytes and the muriate of lime have had their advocates; and perhaps no remedy as an external application, has been found more useful than the muriate of mercury; as an internal remedy, I have likewise seen very good effects from the muriated tincture of iron, in the practice of the New-York Hospital.

In chronic dysentery we should suppose them to have a very good effect from their conjoined purgative antiseptic and tonic qualities. Doctor Seaman says, "A person at the springs who was taking them for dysentery while I was there, informed me, they had formerly cured him of it."

Cutaneous eruptions have always been more or less difficult to cure; hence cases of this kind are found in great numbers at the springs; and from their arising generally from obstructed perspiration, or some disease in the cuticular vessels, the most happy effects have always been experienced from these waters. They should be drank in small quantities and often repeated, so as to open the pores of the skin, and cleanse the surface; which should be assisted by frequent bathing, and ablutions of the body. Those springs near the bathing house in Ballston, should be preferred on account of the greater impregnation of sulphur.

Fevers and agues, or intermittents, have frequently been cured by them. To attain that effect however, they must, beside being drank, also be used as a cold bath just before the expected paroxysm.

In nervous affections, generally, they are used with success. Hypochondriasis, as it is a disease of the mind more than the body, requires but little medicine : It seems to depend on a loss of energy in the brain, or on a torpid state of the nervous system, induced by various remote causes, such as close and intense study, long and serious attention to abstruse subjects, or the constant remembrance of some material loss or disappointment which has occurred. Hence any thing that will divert the attention from pondering upon those ideal calamities which often exist only in the conceptions of the mind, will tend to relieve the patient ; and nothing seems so well calculated to answer that purpose, as a jaunt to a distant part of the country, which necessarily destroys that regular catenation of ideas, excited by the monotony and sameness of every thing around him ; the new objects excite his attention, and thus insensibly abstract his mind from dwelling upon his own imaginary unhappiness ; the exercise of riding with the benefit of new and fresh air, invigorate and brace the solids, and renew the lost energy of his brain. Costiveness is an invariable attendant on this disease, and many dyspeptic symptoms make their appearance, as acid eruptions, spasmodic pains, &c. &c, all of which may be relieved by a proper use of these waters, with due attention to diet.

In consumptions these waters prove injurious ; nor are we surprised at it, since they are found to aggravate all

febrile diseases. I was informed that many consumptive patients had been injured by drinking the water; and I witnessed a striking instance of it at the springs.

Some cases of hæmoptysis, or spitting of blood, have been relieved by a judicious use of the waters. Asthmatic persons have likewise found relief, particularly those who labour under that species of the disease, called the dry or spasmodic asthma; when it is of long standing, with dyspeptic symptoms, and a considerable degree of debility, it requires a cautious use of the waters; they must not be drank towards evening, otherwise they augment, instead of relieving the symptoms.

Of the use of these waters in the removal of worms, little can be said from experience; but sulphur waters have always sustained a reputation for dislodging worms and their nucleus from the bowels, and if we may judge from the known deleterious effects of the carbonic acid upon animal life, when applied so as to affect the organs of respiration, we should naturally conclude them to be very destructive to worms, when drank in such quantities as to immerse them in this fluid. The sulphur springs at Harrowgate in England have long been celebrated for their vermifuge powers. For this purpose then the water must be used which has the strongest impregnation of sulphur.

Persons labouring under epilepsy or any other spasmodic affection, from the variety of their causes, should be extremely cautious in drinking the water, until it be ascertained that plethora does not exist; for in all diseases where the phlogistic diathesis prevails, as in pleurisy,

phrenitis, synochal fevers, &c. the waters are injurious. But, in epileptic fits that depend upon a mobility of the nervous system, independent of any topical affection of the sensorium commune, and recur periodically, that are induced by a fright, (which Boerhaave observes, when sudden and violent, is a frequent cause of epilepsy) or any other cause that would tend to derange the nervous system, and are kept up more by the influence of habit than any real disease; a judicious course of drinking and bathing, with proper attention to diet and exercise, bids fair to remove a disease, the horror of which, affects the mind, and keeps the patient in perpetual apprehension. From authentic sources, I was informed that numbers of epileptic persons had been cured by a judicious use of the waters.

In fact the chalybeate property of these waters, renders them beneficial in almost all chronic disorders. This indeed appears to be the favourite haunt of Hygiea herself, who, almost indiscriminately dispenses health and happiness to all who resort to these springs.

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